

PART I – ORIENTATION

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CHAPTER 1

MODIFICATIONS TO THE 2001 DEPARTMENT OF ECOLOGY STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON

REDMOND REQUIREMENTS

Clearing, grading, and stormwater management issues relating to construction are regulated by section 20.E.90 of the Redmond Community Development Guide. Issues not addressed in the RCDG are regulated by the requirements of the Stormwater Technical Notebook. The 2001 Ecology Manual shall regulate issues not addressed in the Redmond Community Development Guide or the Stormwater Technical Notebook.

KEY MODIFICATIONS FOR REDMOND

Infiltration may be used for recharge or as a method of discharging surface water as an option in areas with highly permeable soils for roof (clean) runoff only. All other infiltration proposals shall be evaluated by the Stormwater Engineer on a case-by-case basis. Infiltration must be preceded by water quality treatment for all surfaces subject to contaminants if the site is in Wellhead Protection Zone 1 or 2. If the site is not in Wellhead Protection Zone 1 or 2, the standard water quality storm must be treated. Aquitards may be used only as top layers in open stormwater infiltration ponds (with good access for maintenance and replacement of the aquitard material).

APPLICABILITY OF THE 2001 ECOLOGY MANUAL IN REDMOND

Volume I: Minimum Technical Requirements and Site Planning

Chapter 1: Introduction

No local changes but used for reference only in Redmond.

Chapter 2: Minimum Requirements for New Development and Re-development

- 2.1- Applies although appropriate applications for infiltration systems are limited.
- 2.3- City definitions shall be used where applicable.

“Pre-developed condition” in Redmond is “forested land cover” except for the valley floors associated with the Sammamish River, Bear Creek, Evans Creek, and Lake Sammamish. For these valley floors, pre-developed condition is “pasture land cover.”

Definition of “Re-development” in Redmond differs from the definition in the 2001 Ecology Manual. Redmond’s definition is as follows:

Re-Development.

The expansion or modification that is of lesser value than the existing improvements. If a project is considered a re-development only the proposed improvements and an equal percentage of the existing improvements shall be brought into compliance with the current code. (Ord. 1877 (160))

For information, Redmond's definition of "New Development" is:

New Development.

A project proposed on vacant land or a project that is a modification or expansion to any existing improvements where the value of the proposed modification is of equal or greater value than the existing improvements. If a project is considered a new development the entire site shall be brought into compliance with the current code. (Ord. 1877 (145))

Figures 2.2 and 2.3- Do not apply in Redmond. Minimum Requirements are based on project thresholds for the whole site.

- 2.4- Redmond treats re-development differently than the 2001 Ecology Manual. The differences are explained below and require that Figures 2.2 and 2.3 in the 2001 Ecology Manual be revised for Redmond. The revised Redmond figures (labeled 2.2R and 2.3R) follow.

Also, Redmond does not have the "stop-loss" provision described in the 2001 Ecology Manual.

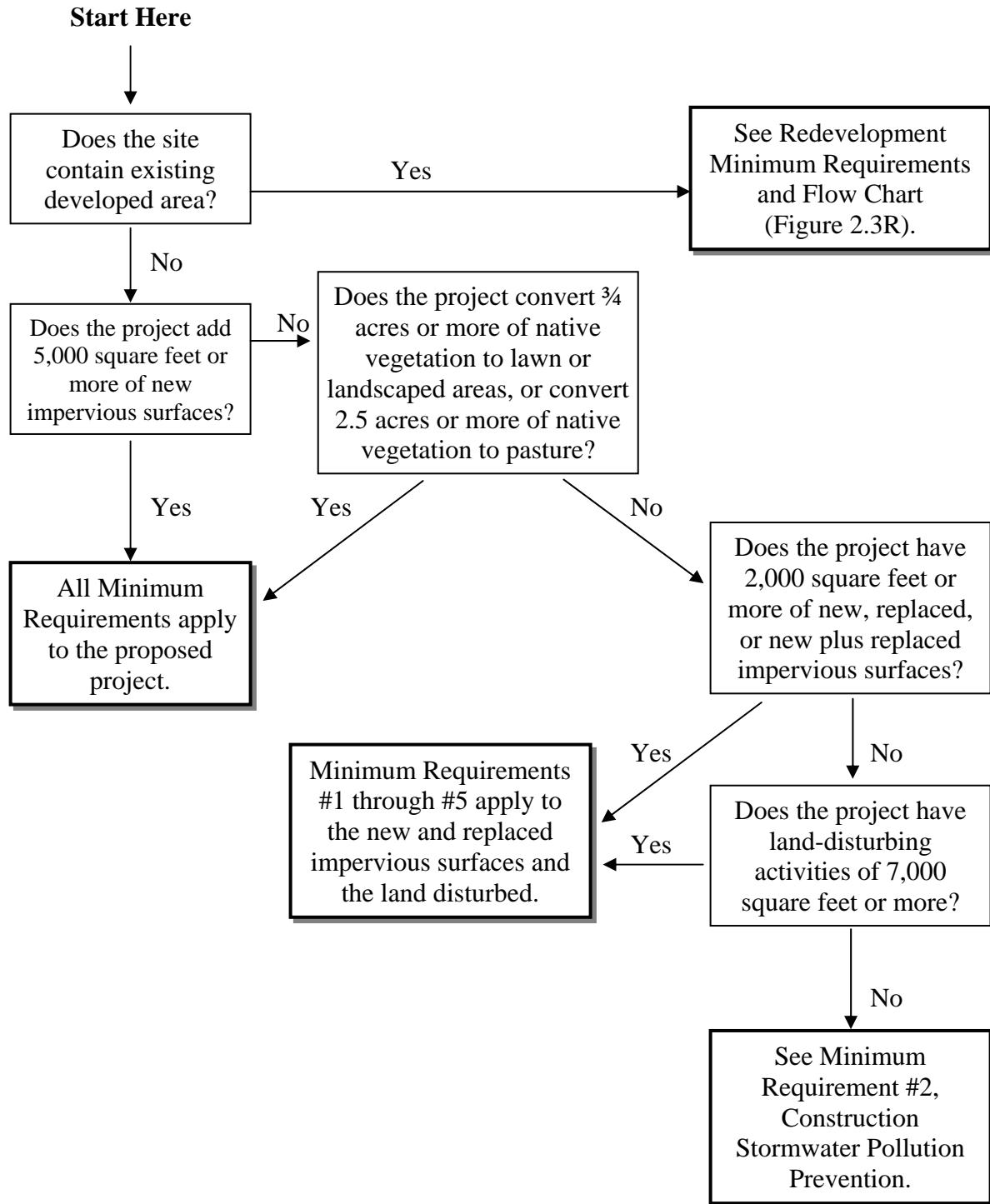
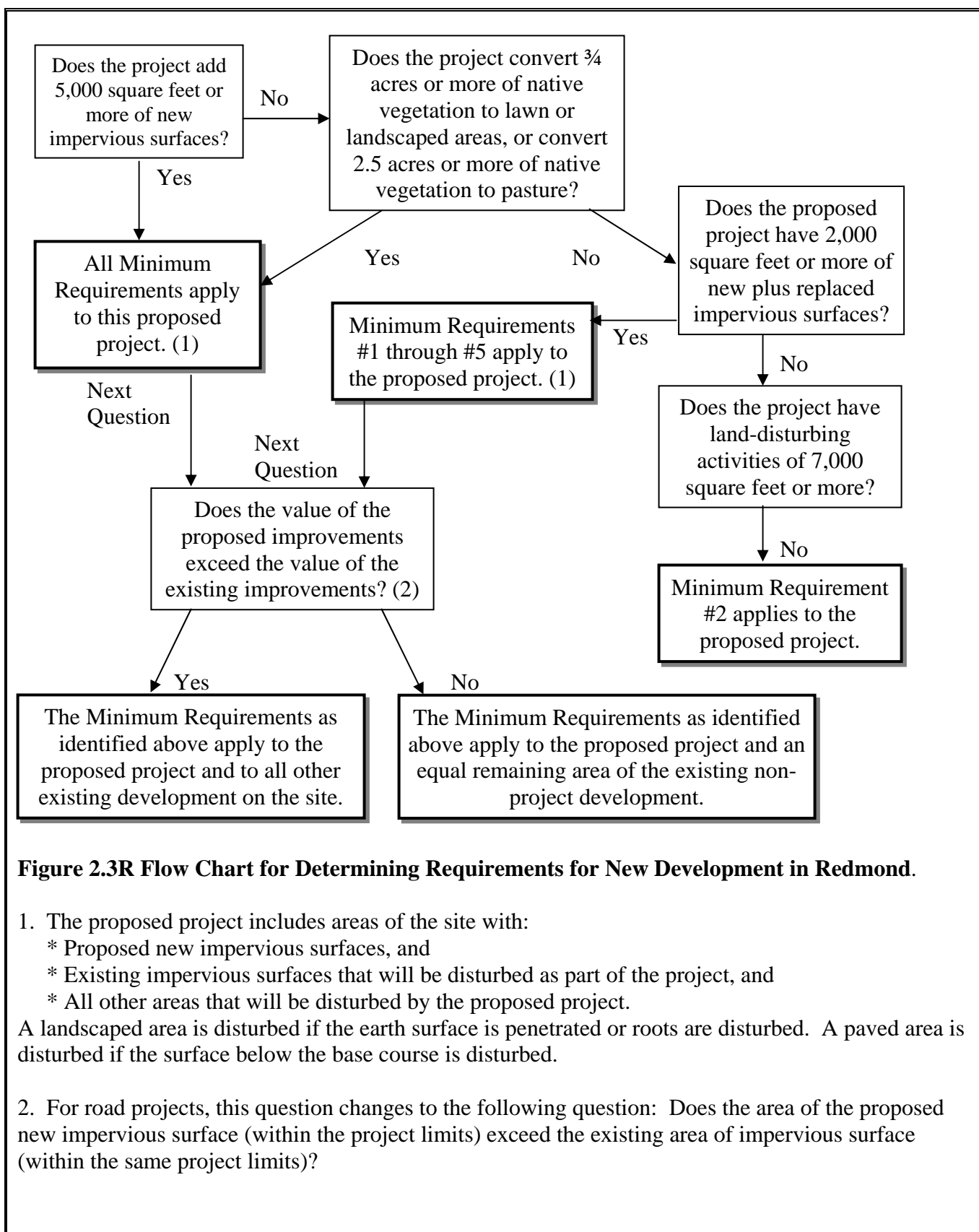


Figure 2.2R Flow Chart for Determining Requirements for New Development in Redmond.



2.5.1- Minimum Requirement #1 (Preparation of Stormwater Site Plans).

Applies.

2.5.2- Minimum Requirement #2 (Construction Stormwater Pollution Prevention (SWPP)).

Applies with the following revisions:

Refer to Chapter 15 of this document for seasonal restrictions.
Use the 10-year storm for all TESC sizing.

For Element 2, street washing is not permitted, even after shoveling or sweeping.
If material is being deposited on off-site streets, the following need to be considered:

- Better sweepers (vacuum type) and repeated or continuous sweeping.
- Wheel wash (or an improved wheel wash if one already exists).
- Special site procedures and provisions (such as transferring haul-outs to trucks that travel only on paved and maintained surfaces in the site).
- Suspension of work until dry weather.

For Element 4, note that Redmond's standard for turbidity for runoff leaving a site is 50 NTU.

If this standard is not being met, additional BMPs (including site-specific designs) shall be applied. If additional BMPs are not applied or are not successful, work may be suspended until a new plan for TESC is formulated and approved by the City.

For Element 8, temporary conveyance channels shall be stabilized for the 10-year, 24-hour frequency storm under developed tributary area conditions.

For Element 12, note that Redmond requires special TESC planning for work in the Rainy Season (October 1 through April 30). See Chapter 15 of the Stormwater Technical Notebook.

2.5.3- Minimum Requirement #3 (Source Control of Pollution).

Applies.

2.5.4- Minimum Requirement #4 (Preservation of Natural Drainage Systems and Outfalls).

Applies with the following revisions:

Use of dispersal systems is limited. In all cases stormwater runoff shall be conveyed to an acceptable discharge point unless the Stormwater Engineer specifically approves an alternative.

Item C of the supplemental guidelines is modified in Redmond as follows:

Off-site conveyance system is required only if the downslope owner(s) grant easements for construction and operation.

If easements are not provided, runoff management shall conform to drainage law and shall, at a minimum, include provisions for detention and water quality and dispersion prior to leaving the development site.

2.5.5- Minimum Requirement #5 (On-site Stormwater Management).

Applies with the following revision:

On-site dispersal shall only be allowed on rural lots (5 acre minimum). Dispersal systems shall be a minimum of 100' up-gradient of the property line.

2.5.6- Minimum Requirement #6 (Runoff Treatment).

Applies with the following revisions:

Infiltration is not approved for water quality treatment in Redmond.

Effective impervious surface shall be modeled as 80% of the maximum allowed impervious surface for single-family lots (for plats and short plats). No credit will be given for porous pavement.

2.5.7- Minimum Requirement #7 (Flow Control).

Applies with the following revisions:

Systems directly discharging to the Sammamish River or Lake Sammamish can be exempted from flow control by the Stormwater Engineer provided: (a) the City has completed a sub-basin analysis that provides for conveyance to these water bodies without on-site detention; and (b) the plan is sufficiently implemented to serve the proposed project site; and (c) stormwater shall be managed such that the 100-year frequency event does not flood proposed buildings, any existing on-site buildings, or other existing buildings on contiguous parcels.

Projects adding between 5,000 square feet and 10,000 square feet of new impervious area may provide a contribution toward the cost of a regional detention system in certain circumstances. The contribution would be in lieu of providing detention onsite if the following conditions are met:

1. Allowing the contribution in lieu of construction shall not create an unsafe situation.
2. The downstream system shall have adequate capacity to convey the undetained flow for the required maximum return period storm events without causing or aggravating any downstream flow-related problems such as flooding or erosion.
3. The project shall be within a sub basin that will be served by a regional detention facility within five (5) years of the start of construction on site.
4. The regional detention project shall have adequate staffing to be completed.

5. The regional detention project shall be on the currently budgeted CIP list and shall have required public funding.

The 0.1 c.f.s. increase threshold is not applied in Redmond.

2.5.8- Minimum Requirement #8 (Wetlands Protection).

Used for reference only. Wetland protection is addressed in the Redmond Community Development Guide.

2.5.9- Minimum Requirement #9 (Basin/Watershed Planning).

Applies.

2.5.10-Minimum Requirement #10 (Operation and Maintenance).

Applies with the following revision:

Maintenance standards shall be per Redmond's "Minimum Maintenance Requirements for Private Stormwater Systems."

2.6.1 Optional Guidance #1 (Financial Liability)

Regarding financial guarantees, Redmond requires only a 1-year performance (defect) guarantee.

- 2.6.2- The Stormwater Engineer may require additional off-site analysis and mitigation based on the results of the ¼ mile downstream analysis (if required).

Chapter 3: Preparation of Stormwater Plans

- 3.1.3- The one-quarter mile distance off-site analysis shall be provided unless specifically waived for a project, by the Stormwater Engineer.

- 3.1.5- The report covering the Stormwater Control Plan shall follow the format and provide the information listed in Table 14-1 of Chapter 14 of the Stormwater Technical Notebook.

Chapter 4: BMP and Facility Selection Process for Permanent Stormwater Control Plans

- 4.2- Infiltration is not approved for water quality treatment in Redmond.

Requirements for treatment and flow control shall be determined by the most restrictive applicable standard within the Redmond Community Development Guide, Stormwater Technical Notebook, or Basin Plan, including design standards mapped in the Redmond Stormwater Comprehensive Plan.

Phosphorus control treatment is required for the Lake Sammamish Basin.

Sand filters are a last choice for water quality systems in Redmond and require a formal, written maintenance plan approved by the Stormwater Engineer. Redmond reserves the right to substitute other treatment options for sand filters (ASF, LSF, SF, and LinSF).

No credit is allowed for partial infiltration in detention ponds.

Table 4.1- Applies, however Redmond reserves the right to substitute other treatment options for sand filters (ASF, LSF, SF and LinSF). Infiltration and filter strips are not approved for water quality treatment in Redmond.

Appendix 1-C- Phosphorus control is required for sites draining to Lake Sammamish.

Appendix 1-D- Used for reference only in Redmond (until better methodology available).

Appendix 2- City Definitions shall be used where applicable.

Glossary and Notations- City Definitions shall be used where applicable.

Volume II: Construction Stormwater Pollution Prevention

Chapter 2: Regulatory Requirements

- Important local regulations and permits include (but are not limited to):
 - Wellhead Protection Zones (especially Zones 1 and 2)
 - Sensitive Areas Regulations
 - Rainy-Season construction guidelines (Chapter 15 of the Stormwater Technical Notebook)
- State regulations provide that turbidity in receiving waters shall not be increased over 5 NTU above existing levels due to runoff from a construction site. In addition to that regulation, additional construction management practices are to be initiated if runoff from a site exceeds 50 NTU (during construction). Additional practices can include advanced levels of TESC. If additional measures are not implemented or additional measures are not feasible, all or parts of a project may be required by City Inspectors to be shut down until a satisfactory plan is developed. If the violations occur in the Rainy Season (October 1 through April 30) suspension of work until after April 30 may be required.

Chapter 3: Planning

3.1- Stormwater pollution prevention plans are not required for single-family residences.

3.2.3- Element #4- BMP C230: Straw bale barrier and BMP C231: brush barrier not allowed in Redmond.

Element #8- 10-year 24-hour storm is required for TESC design in Redmond.

Element #12- Refer to Chapter 15 of this document for seasonal restrictions/exemptions.

- 3.3.2- Narrative section of Construction SWPPP Checklist applies. Refer to City Standard Notes (Appendix A-3) and City Plan Review Checklist (Appendix A-4) for SWPPP drawing requirements.

Chapter 4: Standards and Specifications for Best Management Practices

- 4.1- No disturbance is allowed within 5 feet of driplines of trees to be saved unless specifically approved by the Project Planner.

BMP C103- High visibility plastic or metal fence. Refer to Redmond Standard Specifications and Details.

BMP C104- Stake and wire fence. Not approved in Redmond.

BMP C105- Stabilized construction entrance. Refer to Redmond Standard Specifications and Details.

BMP C106- Wheel wash. Refer to Redmond Standard Specifications and Details.

BMP C107- Construction road/parking area stabilization. Use of soil amendments shall be per City's "WWT Alternative Erosion Control Review and Approval Process for Method Testing and Field Application."

BMP C121- Compost mulch may only be used on proposed landscape areas. It is not approved as a general TESC mulch in Redmond.

BMP C140- Chemical dust suppressants are not approved for use in Redmond.

BMP C202- Rubble concrete channel lining is not approved in Redmond.

BMP C204- Pipe slope drain. Note that this is "temporary" only.

BMP C205- The minimum subsurface drain size shall be 6" diameter.

BMP C220- Catch basin filters are required in Redmond for storm drain inlet control.

BMP C230- Straw Bales. Not approved in Redmond.

BMP C231- Brush Barrier. Not approved in Redmond.

BMP C233- Silt fence. Refer to Redmond Standard Specifications and Details.

BMP C234- Vegetated strips shall have a minimum length of 200 feet.

BMP C240- Sediment trap shall be sized using the 10-year design storm.

BMP C241- Temporary sediment pond shall be sized using the 10-year design storm. Side slopes shall be 3:1 or flatter (interior and exterior).

BMP C250- Construction stormwater chemical treatment and other non-standard treatment systems must be approved per the City “WWT Alternative Erosion Control Review and Approval for Method Testing and Field Application.” Sizing shall be for the 100-year 7-day storm volume unless otherwise approved by the Stormwater Engineer.

- For construction Stormwater Chemical Treatment (BMP C250), applicants shall provide a cash deposit prior to construction document review that the City will utilize to pay for peer review costs. If the estimated deposit is depleted prior to approval of construction documents, additional deposit(s) shall be made prior to proceeding with the reviews. Unused deposits shall be refunded (no interest is paid).

Appendix II-A- Use Redmond Standard Notes (See Appendix A-3 of the Stormwater Technical Notebook).

Volume III: Hydraulic Analysis and Flow Control BMPs

Chapter 1: Introduction

- 1.2- The 2001 Ecology Manual notes that conveyance system design is not addressed in that manual. For basic conveyance system design in Redmond use the latest edition of the WSDOT “Hydraulics Manual” (M23-03).

Note that the 2001 Ecology Manual must be used for detention sizing and stormwater treatment.

Pipe sizing analysis shall be for the 10-year fully-developed, peak flow unless otherwise specified. If the pipe section is a conveyance culvert under roadway, the analysis shall be for the 25-year fully-developed peak flow. If a stormwater facility is designed to control the 50-year developed flow, then the conveyance routes shall be analyzed for the 50-year developed peak flow. Stormwater shall be managed such that the 100-year frequency event does not flood proposed buildings, any existing on-site buildings, or other existing buildings on contiguous parcels. Required conveyance standards may be adjusted by the Stormwater Engineer based on site and downstream conditions.

Stream culverts shall be designed to have natural bottom conditions, with 1/3 of the pipe diameter buried. Culverts used for stream conveyance shall be a minimum of 24 inches in diameter. Bridges shall be the first choice for stream crossings.

For computation of hydraulic grade lines in Redmond use one of the following models:

King County Surface Water Management Backwater Analysis Program
StormCadd by Haested Methods
Mouse by DHI Software

For pipe systems designed to convey the 10-year storm a minimum of 1 foot of freeboard is required. Systems conveying the 25-year storm shall provide a minimum of 6 inches of

freeboard. For 100-year conveyance the 100-year flow cannot overtop the grate on any structure.

Chapter 2: Hydrologic Analysis

- 2.1- A continuous run model, either WWHM, KCRTS or HSPF shall be used for hydrologic analysis (no event models).

Design storms are specified in the Redmond Community Development Guide.

For basins over 320 acres in size HSPF shall be used.

No credit is given for use of porous pavement in Redmond.

Unless otherwise approved by the Stormwater Engineer all impervious areas are considered effective impervious areas in the developed condition.

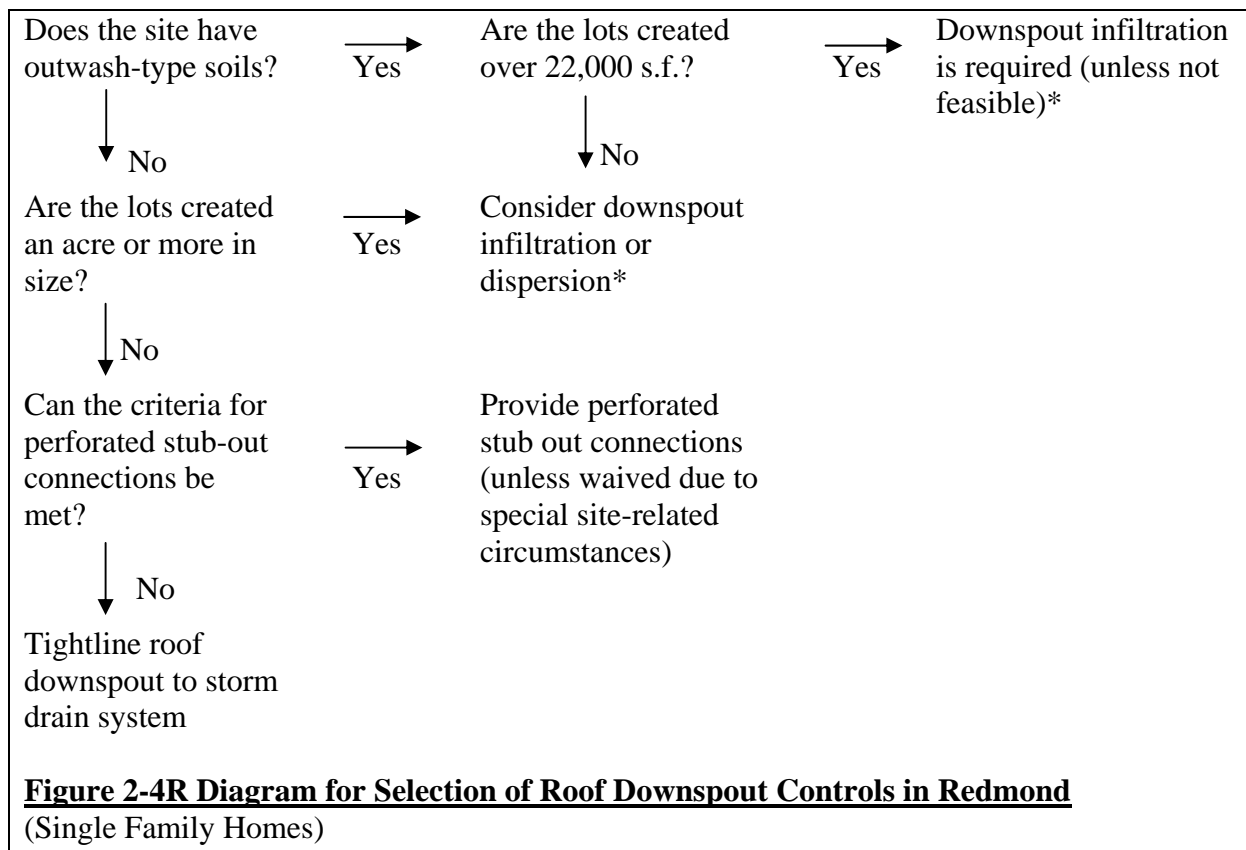
- 2.3.2- Table 2.3 is not used in Redmond. For commercial sites use actual impervious area. For single-family developments use 80% of the maximum impervious area allowed by the zoning code, or a maximum of 4,200 s.f. per single-family lot.
- 2.3.3- For reference only. Continuous run model required in Redmond.
- 2.3.4- Do not adjust outflow requirements for sizing to accommodate a minimum orifice size. If necessary upsize the orifice size to 0.5 inch diameter after sizing the facility.

Chapter 3: Flow Control Design

3.1- Roof Downspout Controls:

- Section 3.1 of the 2001 Ecology Manual applies only to single family detached homes (with or without an attached or detached Accessory Dwelling Unit).
- The selection of roof downspout controls shall be as specified in Figure 1-1, following, which differs from the 2001 Ecology Manual.
- The following sub-sections of the 2001 Ecology Manual apply as written in the 2001 Ecology Manual for Downspout Infiltration Systems (Manual 3.1.1.):
 - Flow credit for roof downspout infiltration.
 - Procedure for evaluating feasibility.
 - Design criteria for infiltration trenches.
 - Design criteria for infiltration drywells.
- The following sub-sections of the 2001 Ecology Manual apply as written in the 2001 Ecology Manual for Downspout Dispersion Systems (Manual 3.1.2):
 - Flow credit for roof downspout dispersion.
 - Design criteria.

- The sub-section regarding perforated stub-out connections (Manual 3.1.3) applies with modifications as follow:
 - The setback from any structure, property line, or steep slope (over 40%) shall be 50 feet.
 - The perforated pipe shall not be located where percolating water will encounter and be intercepted by another nearby (within 25 feet) utility trench or foundation drain.



*Note that the project receives “credit” (per the 2001 Ecology Manual) to reduce size of flow control facilities when some runoff is infiltrated.

3.1.1- Figure 3.2- 6” minimum diameter pipe required. Flexible single wall pipe is not approved in Redmond.

Figure 3.4- 6” minimum diameter pipe required.

3.2.1- Proposed slopes shall be 3:1 or flatter (may use 2:1 if within City right-of-way with approval of the Stormwater Engineer).

Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer.

Modular grid pavement is only allowed if specifically approved by the Stormwater Engineer.

Ponds shall be setback a minimum of 10 feet from structures, property lines or required vegetated buffers, and 50 feet from the limits of steep slope areas. The setback from steep slopes may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide. Conveyance pipes in steep slope areas shall be installed on the surface of the slope, with the minimum disturbance possible, and shall require applicable City approvals.

Minimum setback required for trees is 8 feet in Redmond.

Detention ponds in infiltrative soils shall be lined. No credit is given for partial infiltration in Redmond.

3.2.2 and 3.2.3-

Corrugated metal detention pipes are not approved in Redmond.

CMP risers are not approved in Redmond.

Tanks shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The setback from steep slope may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide.

Vaults shall be setback a minimum of 10 feet from structures, property lines, required vegetated buffers, and 25 feet from the limits of steep slopes. The Stormwater Engineer may approve integrated vaults constructed as part of a building structure. The setback from steep slopes may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide.

Pressure tests may be required by the City Inspector. Avoiding leakage is particularly critical in Wellhead Protection Zones 1 and 2. Tanks that do not pass pressure tests must be repaired or replaced.

3.2.4- Figure 3.17- Refer to City Standard Detail. Shear gates are not approved in Redmond.

Figure 3.18- Refer to City Standard Detail. Shear gates are not approved in Redmond.

Figure 3.19- Refer to City Standard Detail. Shear gates are not approved in Redmond.

3.2.5- Parking lot ponding is only allowed for the 50-year storm event or greater. A maximum ponding depth of 6 inches is allowed. The 100-year event may not impact any buildings or other structures.

Roof detention is not allowed in Redmond at this time.

3.3- Infiltration may be used as a last option as a method of discharging surface water. However, infiltration must be preceded by water quality treatment for all flows to be infiltrated from surfaces subject to contaminants.

3.3.5- The soil infiltration rate may be determined by a falling head test conducted by a qualified engineer using commonly accepted methods. Infiltration locations will be considered

unacceptable if the design infiltration rate is less than 1.0 inches/hour. In no case shall the design infiltration rate be more than 20.0 inches/hour.

- 3.3.6- At least 200 feet shall be provided for separation from public wells.
Figure 3.28 and 3.29- Required to have water quality treatment prior to infiltration in Redmond.

Figure 3.30 and 3.31- Required to have water quality treatment prior to infiltration in Redmond.

- 3.3.7- Construction plans shall include a note to require field verification during construction of the facility, of soil conditions, and infiltration rates by an engineer with experience in stormwater management and licensed in the State of Washington. The engineer shall provide a written statement to the City of Redmond related to the field verification of the design parameters.

- 3.3.9- Geotextile fabric or sand base required for infiltration trenches in Redmond.
Figure 3.32- The minimum allowable perforated pipe diameter is 6 inches.

Appendix IIIB: Western Washington Hydrology Model – Information, Assumptions, and Computation Steps

- B-6- Use 80% maximum impervious area instead of 4200 s.f. per lot for single-family lots. No credit is given for porous pavement in Redmond.
- B-8- Under “Other Development Options and Model Features,” in item C, Redmond uses the fully developed (not “existing”) 100-year peak flow rate from upstream, off-site areas as the basis for determining by-pass provisions.

Volume IV: Source Control BMPs

Appendix IVB: Stormwater Pollutants and Their Adverse Impact

Use City definitions where applicable.

Appendix IVG: Recommendations for Management of Street Wastes

Pg. G-12 Decant liquid may not be discharged to the storm system following basic treatment.

Volume V: Runoff Treatment BMPs

Chapter 1: Introduction

- 1.4.3- Coalescing plate systems are a last choice for water quality systems in Redmond and require a formal, written maintenance plan approved by the Stormwater Engineer.
Infiltration is not approved for runoff treatment in Redmond.

Filtration (sand/media) requires specific approval by the Stormwater Engineer and may require post construction monitoring.

Emerging technologies require specific approval by the Stormwater Engineer and may require post construction monitoring and financial guarantees.

Chapter 2: Treatment Facility Selection Process

Figure 2.1- Applies, however Redmond reserves the right to substitute other treatment options for sand filters (ASF, LSF, SF and LinSF).

2.1- Phosphorus control is required for the Lake Sammamish Basin within the City.

Table 2.1- Applies, however Redmond reserves the right to substitute other treatment options for sand filters (ASF, LSF, SF and LinSF).

Table 2.3- Infiltration and filter strips are not approved treatment options in Redmond.

Chapter 3: Treatment Facility Menus

3.3- Applies, however Redmond reserves the right to substitute other treatment options for linear sand filters.

3.4- Applies, however Redmond reserves the right to substitute other treatment options for sand/media filters, and the use of infiltration is limited.

3.5- Applies, however Redmond reserves the right to substitute other treatment options for sand/media filters, and the use of infiltration is limited.

3.6- Bio-infiltration swales, infiltration, filter strips, and wet vaults (dead storage only) are not approved treatment options in Redmond.

Chapter 4: General Requirements for Stormwater Facilities

4.3.2- Up to 25% of the pond perimeter may have vertical walls. Anything greater will require approval of the Stormwater Engineer.

4.4.1- Liners required for all ponds (impermeable till layer, synthetic liner or bentonite).

4.4.3- Concrete liners are not approved in Redmond.

4.5.3- Drop structures are not allowed unless specifically approved by the Stormwater Engineer.

Figure 4.8- 6" minimum diameter perforated pipe required.

Chapter 5: On-Site Stormwater Management

5.3.3- Full dispersion credit only allowed on rural (5-acre minimum) lots.

Roadway dispersion is limited. In all cases stormwater runoff shall be conveyed to an acceptable discharge point unless an alternative is specifically approved by the Stormwater Engineer.

BMP T5.31- Vegetated rooftops are not approved for use in Redmond.

BMP T5.32- Cisterns are not approved for stormwater management in Redmond unless specifically approved by the Stormwater Engineer.

BMP T5.33- Concave vegetated surfaces are not approved for stormwater management in Redmond unless specifically approved by the Stormwater Engineer.

BMP T5.34- Multiple, small basins are not approved for stormwater management in Redmond unless specifically approved by the Stormwater Engineer.

BMP T5.35- Engineered soil/landscape systems are not approved for stormwater management in Redmond unless specifically approved by the Stormwater Engineer.

5.3.4- Permeable/porous pavement. Not allowed in Redmond unless approved by the Stormwater Engineer. No credit shall be given for permeable/porous pavements.

Figure 5.7- Not approved for use in Redmond at this time.

Porous pavers are not allowed in Redmond unless approved by the Stormwater Engineer. No credit shall be given for porous pavers.

Permeable concrete pavers are not allowed in Redmond unless approved by the Stormwater Engineer. No credit shall be given for permeable concrete pavers.

Chapter 7: Infiltration and Bio-infiltration Facilities

Not applicable. Infiltration and bio-infiltration are not approved for runoff treatment in Redmond.

Chapter 8: Sand Filtration Treatment Facilities

Sand filtration systems are not allowed in Redmond unless specifically approved by the Stormwater Engineer.

Chapter 9: Biofiltration Treatment Facilities

9.4- Basic filter strips and narrow area filter strips are not approved for use in Redmond.

Swales must be at least 200 feet long. Swale length may be reduced to 150 feet for re-development projects if no feasible alternative exists. Maximum swale bottom width shall be 8 feet (parallel swales are acceptable if needed to provide adequate treatment area). Biofiltration swales and similar water quality facilities must be lined (e.g. geomembrane) in Wellhead Protection Zones 1 and 2, and must be lined in other areas unless constructed over at least one foot of compacted till (native or constructed).

If biofilters are not able to be located off-line, the swale shall be designed so the maximum flow possible in the swale (not over the 100 year) does not produce a velocity over 4 feet per second.

Table 9.1- Underdrains are not required. Use wetland planting mix if the slope is 0.5% or less.

Figure 9.2- Underdrains are not required.

BMP T9.30- Continuous inflow biofiltration swales are not allowed in Redmond unless approved by the Stormwater Engineer.

BMP T9.40- Basic Filter Strip. Not approved for use in Redmond.

BMP T9.50- Narrow Area Filter Strip. Not approved for use in Redmond.

Chapter 10: Wet Pool Facility Designs

- 10.3- BMP T10.10- Provide a 5-foot wide level bench around the perimeter of the pond at or 1 foot below the permanent water surface.

Liners are required for all wet ponds (impermeable till layer, synthetic liner, or bentonite).

Gravity drains are not required for wet ponds or vaults. Access roads to pond bottom are not required for wet ponds.

Wet ponds that are intended solely for water quality treatment shall have a high flow bypass to divert peak flows above the water quality design storm.

Shear gates are not approved for use in Redmond.

Wetponds shall be setback a minimum of 10 feet from structures, property lines, or required vegetated buffers, and 25 feet from the limits of steep slopes. The setback from steep slopes may be reduced per Section 20D.140.10-120 of the Redmond Community Development Guide.

A minimum, average depth of 3 feet is required for water quality treatment in vaults and tanks.

Chapter 11: Oil and Water Separator BMPs

- 11.2- Coalescing plate separators are a last choice for water quality systems in Redmond and require a formal, written maintenance plan approved by the Stormwater Engineer.

BMP T11.10- API separators rise rate shall be 0.2187 foot/minute.

Appendix V-A: Basic Treatment Receiving Water

- A-1- In Redmond, Lake Sammamish (as well as the Sammamish River) shall not be included in the list for Basic Treatment. Proposed projects draining to these water bodies shall provide Enhanced Treatment as specified in the 2001 Ecology Manual based on project size, proposed land use, and proposed activities.

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CHAPTER 2

LOCAL DESIGN PRACTICES

This chapter contains information on specific issues for projects in Redmond to help define what is necessary to meet our local codes and regulations and to help define terms in ways that are meaningful to specific engineering design situations in Redmond.

PROPER DRAINAGE

The Stormwater Technical Notebook describes minimum drainage requirements. These requirements must be addressed in all projects (Small, Medium, or Large) whether or not plans and permits are required. Even though plans and permits are not required for Small Projects, proper drainage facilities are required with all projects.

Proper drainage directs runoff away from structures, meets legally accepted practice, and meets the intent of RCDG Chapter 20E.90. For projects not requiring plans or permits, drainage systems are not required by code to have detention or formally designed water quality facilities. Nevertheless, if downstream conveyance capacity is not adequate, the project proponent may elect to provide detention or infiltration. Projects adding surfaces to be used by vehicles need to protect groundwater (using impermeable layers or paving) and must route runoff through a floatables separator before discharge from the site. Drainage systems shall be provided to prevent flooding of developed areas, connect downspouts, and provide positive drainage for footing drains.

IMPERVIOUS AREA FOR SINGLE FAMILY RESIDENTIAL PLATS AND SHORT PLATS

Projects creating lots for single-family houses (residential plat and short plat projects) shall provide drainage systems for all lots. The drainage systems shall address runoff quantity and quality, based on the impervious area assuming no impervious areas in the existing pre-developed condition.

These projects shall assume each lot has impervious surface based on the following formula. For each lot created, the assumed impervious area is taken as the area of the lot, less any unbuildable area as defined in Sensitive Area regulations times the percentage of allowable coverage (from the Land Use section of the Redmond Community Development Guide) times 0.80. However, the maximum impervious area one is required to assume for a lot is 4,000 square feet (unless specific building plans indicate larger areas).

The total impervious area for these projects is taken to equal the paving, sidewalks, etc., required of the project plus the assumed impervious area of each lot.

DRAINAGE CONNECTIONS FOR ALL LOTS

All types of plats and short plats (residential, commercial, industrial, and others) shall provide for drainage connections on each lot.

Drainage connection points are to be located at the low elevation point of the allowable building area of each lot. The connections must be below finished grade so as to allow connection of footing drains, roof drain leaders, and other drains.

Providing for drainage connections typically means providing a piped system from the drainage connection points described above to the drainage system in the plat or short plat. A maximum of three (3) lots may be connected to a common private drainage pipe. Multiple drainage pipes may be used.

In some cases it may be acceptable to include only the plan for the lot drainage connections as part of the City-approved drainage plan for the plat or short plat and defer construction until building construction on the lots.

In some cases, it may be possible (and even desirable) to infiltrate runoff from buildings. Infiltration can reduce runoff problems and maintain groundwater supplies and can reduce monthly stormwater utility bills. Infiltration is generally acceptable where the soils and geology are suitable. Pre-treatment to provide acceptable water quality is still required and is particularly critical in the vicinity of the City's wells (see section in this chapter regarding the Wellhead Protection Program). Percolation tests are required at all proposed infiltration locations.

In all cases, appropriate easements must be provided, as part of the plat or short plat, for the specific drainage systems shown on the construction documents. Those documents shall also show anticipated grading, rockeries, retaining walls, etc. Construction of the lot drainage connection systems must be feasible and allow connection to the proposed plat improvements or to the documented infiltration areas. The minimum easement width is 5 feet.

SEPARATION OF SYSTEMS SERVING SEPARATE OWNERS

Stormwater facilities provided to control quantity and quality generally should be provided within the site they are serving although certain exceptions are acceptable.

Facilities for single family plats may be located in common areas (even in public roads that are created by the plat or short plat).

Water quantity and quality controls provided for the private part of a project shall be separate from water quantity and quality controls for public impervious surfaces that are part of the project. Individual lots within single family plats and short plats with public road improvements may drain to the public water quantity and quality control systems constructed to serve the development.

In some circumstances, water quantity and quality control requirements for the proposed impermeable areas may be met by adding such control(s) to equivalent existing developed areas of the site, which do not already have such controls.

WATER QUALITY FACILITIES

Water quality controls for impermeable areas to be public shall be biofiltration facilities unless there is no alternative. Lack of land in the project area shall generally not be considered reason for an alternative treatment system.

Where biofiltration is not possible, a gravity-type water quality treatment facility shall be provided (for projects below the thresholds requiring plans and permits, a floatables separator shall be provided for surfaces used by vehicles).

CONTRIBUTION IN LIEU OF PROVIDING COMPENSATING FLOOD STORAGE

Compensating flood storage is required in certain areas of the city for projects proposing fill in a floodplain.

In general, the compensating storage shall be provided onsite or an approved offsite location during project construction. Under very unusual, limited situations, the City may accept contribution to an existing public project that would then provide the extra-required storage. The following conditions shall be met before the City should consider project contribution:

The public project being contributed to shall be feasible.

The public project shall be physically able to be constructed. The project shall be legally able to be constructed including land ownership or use authorization, and all permits that could affect feasibility are completed.

The public project shall be on the currently budgeted CIP list and shall have required public funding.

The public project shall be scheduled for construction within two (2) years of the start of construction onsite.

The public project shall have adequate staffing to be completed.

Allowing the contribution in lieu of construction shall not create an unsafe situation.

The monetary contribution shall be equal to the pro-rata volume share of the actual project including all costs (such as land acquisition, consulting, staff time, permits, construction, monitoring/as-built adjustments, and so forth).

INTERNAL BUILDING CHANGES AS RE-DEVELOPMENT

Re-development projects that are confined to existing interior spaces shall not require new drainage controls (except those drainage systems described above as may be required by the City for proper drainage).

If re-development projects include any work involving the exterior part of the site, the project shall be subject to re-development requirements under RCDG. Where exterior work occurs, the value of the interior work shall be included in determining the extent of exterior re-development requirements.

SITE IMPROVEMENTS INVOLVING HAZARDOUS MATERIALS

Site improvements to existing facilities that would otherwise not be subject to stormwater system improvement but involve hazardous materials shall meet the water quality requirements of Section 20.E.90.

MIXING CLEAN WATER WITH SITE RUNOFF DURING CONSTRUCTION

The following is a design goal: Stormwater that has been treated for water quality should not be mixed with stormwater that has not been treated for quality.

“PRE-DEVELOPED” CONDITION

Hydrologic computations to size water quality and quantity control for sites above the Sammamish Valley floor shall assume a pre-developed condition as 100% second growth forested. For the valley floor, “pasture” shall be used as the pre-developed condition. All sites will assume a pre-developed site condition as 100% pervious.

DISCHARGE TRIBUTARY TO LAKE SAMMAMISH

Projects within the Lake Sammamish Basin that are Large Projects (subject to Minimum Requirement #6) are required to provide phosphorus controls. Section 3.3 of the 2001 Ecology Manual (Volume V, page 3.3) provides information.

In addition to the Treatment Methods listed in the 2001 Ecology Manual, phosphorous control may be provided by applying measures listed below such that a score of 10 points or more is achieved. Credit options for phosphorus reduction are as summarized in Table 2-4 and are described as follows:

1. **Leaving part of the site undisturbed, including undevelopable land.** Full credit, or 10 points, is awarded for leaving 65 percent of a site in undisturbed native vegetation or areas re-established in native vegetation. Sensitive Areas and their buffers may be counted. All areas for phosphorus credit must be in tracts dedicated to the City or protected by an easement. A descending scale of points applies where lower percentages of the site are left undisturbed.
Possible credit = 1 to 10 points.
2. **Directing runoff from pollution-generating surfaces to grassy areas with level spreading.** Directing runoff from pollution-generating areas to grassy areas that are not fertilized or to areas of native vegetation results in pollutant removals similar to those obtained in swales while also providing an increased opportunity for infiltration. To use this option, flows must remain unconcentrated and be spread uniformly over the intended area.

The vegetated area receiving dispersed flows should be at least 25 percent as large as the area contributing flow. The receiving area should be increased by one percent for each percent increase in slope over four percent. The area should be configured so that the length of the flow path is no longer than the width over which flows are dispersed.

Example:

Assume a parking lot is 100'x600', or 60,000 sf. Flows will be dispersed through an adjacent area of native vegetation with a slope of 8 percent.

The area of vegetation must be at least 17,400 sf (25% +4% (for steeper slope) x 60,000 sf). Assuming runoff is dispersed continuously along the wider edge of the parking lot, the flow path would need to be at least 29 feet ($17,400' \div 600'$). If the water were dispersed along the shorter edge, flow path would be 174 feet ($17,400' \div 100'$).

However, this flow path would be longer than the width over which flows were dispersed (100'), and would not be a satisfactory option. The parking lot could be graded, however, so that flows would be dispersed at both of the 100-foot ends, making each flow path 87 feet, which would be acceptable.

Credit is proportional to the total volume of runoff diverted; one point is earned for every 25 percent of total volume so directed. **Possible credit = 1 to 4 points**

3. **Providing covered parking or covered waste disposal and recycling areas isolated from the stormwater conveyance system.** This item applies to all land uses for which covered parking for employees, residents, guests, and the general public is provided. This can be achieved for commercial land uses simply by covering the parking required by code. For other land uses, provision of additional covered parking for guests or the general public (total parking) in lieu of on-street parking can be used to provide this assurance. It is intended that covered parking would isolate the area from stormwater run-on as well as direct rainfall. A low curb, berm, or enclosing walls, in addition to a roof, would typically be needed.

The water quality credit is proportional to the percentage of the total surface area that is effectively covered. One point is earned for every 25 percent of parking covered and protected from run-on. One additional point is earned if all solid waste management areas are covered and protected from stormwater run-on. **Possible credit = 1 to 5 points**

4. **Providing covered vehicle washing areas connected to the sanitary sewer system.** This item applies to commercial, industrial, and multi-family sites. Frequent car-washing can contribute significant amounts of phosphorus to stormwater. Note that sewer districts may have pretreatment requirements before allowing connection to the sanitary sewer. **Possible credit = 3 points**

Credit is to be applied to the whole site

If the credit option is used, it should be applied for during initial drainage review by the City. The preliminary stormwater report should include a **written request for credit** based on either the site plan or the grading plan for the project. The request should outline how the point totals are to be achieved. **Credit is not given unless requested.**

Table 2-4 Water quality credit for phosphorus control	
Credit Option	Points
Leaving site undisturbed, in native vegetation. Buffers without trails may be counted.	At least 65 % = 10 60 % = 9 55 % = 8 50 % = 7 45 % = 6 40 % = 5 35 % = 4 30 % = 3 25 % = 2 20 % = 1
Directing road runoff to pervious, non-pollution-generating vegetated area.	100 % of volume = 4 75 % of volume = 3 50 % of volume = 2 25 % of volume = 1

Credit Option	Points
Covered parking protected from run-on	100 % of parking = 4 75 % of parking = 3 50 % of parking = 2 25 % of parking = 1
Covered car wash area connected to sanitary sewer (multi-family)	3
Covered solid waste storage area	1

STORMWATER VAULTS

A few details regarding vaults:

- Confined space entry provisions apply.
- Maintenance must be feasible and designs should strive to facilitate maintenance (design adjustments to facilitate maintenance may be required during plan review).
- Vaults must be designed for appropriate soil, groundwater, and surface loadings. Separate review and permits are required from the Building Department.

DUMPSTER AREA STORMWATER DRAINAGE

Dumpster areas are classified into one of three (3) groups. Generally, as an introduction, Group 1 is for small containers (not over 1.5 cubic yards) and single family sites, Group 2 is for all other sites that are not listed in Attachment 1, and Group 3 is for all sites involving uses listed in Attachment 1.

Quite often, the land uses at a site change over time. A development or re-development may initially have a Group 1 or Group 2 dumpster area. At a later time, if this site's land use changes and a Group 3 dumpster area becomes appropriate, the City may require an upgrade to the Group 3 specifications.

For existing developments which need to add dumpster areas, these guidelines generally apply, but requirements may be adjusted or alternatives accepted by the City Development Services Division based on the particular characteristics of the existing situation.

If compactors are used, the dumpster area is in Group 2 or Group 3 regardless of dumpster capacity.

A dumpster area may contain more than one cart or dumpster. To be considered separate areas two (2) dumpster areas need to be separated by at least 25 feet.

GROUP 1: SINGLE FAMILY PARCELS AND DUMPSTER AREAS HAVING TOTAL DUMPSTER CAPACITY NOT OVER 1.5 CUBIC YARDS

Group 1 Dumpster Areas include:

- a. All dumpster areas where the volume of the container(s) does not exceed 1.5 cubic yards; and,
- b. All dumpster areas in single family lots except where certain on-site businesses are conducted. For single-family lots where on-site businesses create additional pollutant potentials in the dumpster area, the dumpster areas may be assigned to Group 2 or Group 3 by the Development Services Division.

No special requirements apply to Group 1 dumpster areas.

GROUP 2: DUMPSTER AREAS HAVING CAPACITIES OVER 1.5 CUBIC YARDS AND USES NOT LISTED IN ATTACHMENT 1

Group 2 dumpster areas include areas where the capacity of the dumpster(s) exceed 1.5 cubic yards or dumpsters have compactors and site uses are not included in Attachment 1.

For Group 2 dumpster areas, special requirements apply. Surface drainage from dumpster areas may be connected to the storm drainage system, provided:

- a. Dumpster areas are sloped to drain out onto paved, impervious surfaces (such as parking lots).
- b. No storm drain inlets are located in the dumpster area.
- c. Runoff from the dumpster area flows over the paved surface at least 15 feet prior to entering a catch basin.
- d. Catch basins receiving runoff from dumpster areas are Type II, 48-inch diameter minimum, with a "tee" fitting providing floatables separation (and a cleanout port with gasketed cover) but no overflow standpipe.
- e. Potential pollutants are not put in the dumpsters on any routine basis.

If pollutants are put in the dumpster on any routine basis the City may require the dumpster area to meet the requirements for Group 3 dumpster areas.

GROUP 3: DUMPSTER AREAS HAVING CAPACITIES OVER 1.5 CUBIC YARDS AND USES LISTED IN ATTACHMENT 1

Group 3 dumpster locations include areas where the capacity of dumpster(s) exceed 1.5 cubic yards or dumpsters have compactors and the site uses include any uses described in Attachment 1.

In Group 3 dumpster areas, surface drainage from the dumpster areas may be handled in one of two ways:

Preferred Alternative:

Surface drainage from dumpster areas may be connected to the sanitary sewer, provided:

- a. The dumpster area is covered.
- b. The surface drain from the dumpster area to the sanitary sewer is directed through a City-approved baffle-type oil/water separator.
- c. Any issues are resolved with the Fire Department (they may require fire sprinklers) and the Planning Department (regarding aesthetic and site-planning issues).

Alternative if the Preferred Alternative is not feasible:

Surface drainage from dumpster areas may be connected to the storm drainage system, provided:

- a. No storm drain inlet is located in the dumpster area.
- b. Dumpster areas are sloped to drain out onto paved, impervious surfaces (such as parking lots).
- c. Runoff from the dumpster area flows over the paved surface at least 15 feet prior to entering a catch basin.
- d. Catch basin(s) receiving runoff from dumpster areas are Type I or Type II.
- e. Storm drain pipe(s) from catch basins receiving dumpster area runoff convey the runoff through a baffle-type oil/water separator prior to connection to other parts of the storm drainage system. The flow rate for design of the separator shall be the sum of two rates. The first rate is the peak 100-year storm runoff in cubic feet per second that can enter the separator from contributing areas (Rational Method acceptable). The second rate is the capacity of the dumpster(s) in cubic feet, divided by 5 minutes (300 seconds) to yield cubic feet per second.
- f. The storm drain pipes that carry flow from the catch basins receiving dumpster area runoff to the separator are sewer grade PVC with gaskets or Class 50 (minimum) ductile iron with gasketed joints.

Dumpster Area Stormwater Drainage
Attachment 1
Group 3 Land Uses

Dumpster areas are in Group 3 if they serve land uses that are normally associated with the following types of waste materials:

- Accumulated food wastes
- Vegetable or animal grease
- Used oil
- Liquid feedstock
- Cleaning chemicals
- Liquid or solid dangerous waste (as defined by the Department of Ecology under WAC Chapter 173-303). The Development Services Division may require special handling for any items on this list and not allow their discharge to the storm or sanitary sewer systems.

Additional guidance regarding applicable uses is contained in the 2001 Ecology Manual. The determination about a specific use in Redmond will be made by the City's Technical Committee.

Note that multi-family residential uses (including town homes), printing and publishing businesses, restaurants, gas stations, vehicle maintenance facilities, and dry cleaners are examples of common uses in Redmond that are typically included in Group 3.

Stormwater Management in Wellhead Protection Zones 1 and 2

In November of 2003 a comprehensive City-wide Ordinance (number 2180) went into effect to address protection of the groundwater supplies for our City's wells, important sources of water for the public water supply in Redmond.

Wellhead Protection Zones were established, based on proximity to and groundwater travel times to the various well locations. The Wellhead Protection Zones are shown on the City of Redmond City Services Webpage, under Land Use, labeled: Wellhead Protection Map, link following: (<http://www.redmond.gov/cityservices/maps/FINALWellheadProtectionSAOMap.pdf>). Zones 1 and 2 delineate the 6-month and 1-year time of travel zones for groundwater to reach the wells and are, therefore, the areas of greatest concern.

In Zones 1 and 2, certain land uses are prohibited, as noted in the current Redmond Community Development Guide Regulations (20D.140.10-220). Other special requirements for these zones are listed in 20D.140.10-300.

Stormwater systems for new development and redevelopment projects in Zones 1 and 2 are to address the following:

1. Conveyance systems shall be sized to accommodate the 50-year frequency storm.

2. Prior to recharge, water quality treatment shall be provided that is sized to accommodate the 50-year frequency storm.
3. Treatment systems shall be selected based on the 2001 “Stormwater Management Manual for Western Washington” published by the State Department of Ecology. As provided in that Manual, the Stormwater management system for a site must:
 - a. Provide basic or enhanced levels of treatment as specified in the 2001 Ecology Manual.
 - b. Select treatment systems based on the pollutants associated with the proposed development.
 - c. Provide structural source control BMPs as applicable under Volume IV, Chapter 2 of the 2001 Ecology Manual based on the land use and specific pollution generating sources (such as “loading and unloading areas”).
4. During construction, if construction vehicles will be refueled onsite and/or the quantity of hazardous materials that will be stored, dispensed, used, or handled on the construction site is in aggregate quantities equal to or greater than 20 gallons liquid or 200 pounds solid, exclusive of the quantity of hazardous materials contained in fuel or fluid reservoirs of construction vehicles, the City may require any or all of the items listed in the Redmond Community Development Guide 20D.140.10.300(1)(f). Generally, the following items will be required in writing as part of the TESC Plan:
 - a. Monitoring plan.
 - b. Designated project contact.
 - c. Secondary containment.
 - d. Provisions to secure hazardous materials.
 - e. Response to leaking vehicles and equipment.
 - f. Practices and procedures regarding transfer of flammable and combustible liquids.
 - g. On-site cleanup materials (materials are to be listed in the TESC Plan) and other containment and cleanup provisions. All hazardous material releases shall be contained, cleaned up, and reported.

The Stormwater Report required for projects shall include a section describing how each of the items 1 through 4 above have been addressed in the plans for the proposed project.

All stormwater systems shall meet the material and construction standards equal to those specified for the City’s sanitary sewer system as listed below:

Materials

- Pipe:
 - Ductile iron [per WSDOT/APWA Standard Specifications 2000-English Units, 9-05.13]

- Solid wall PVC sanitary sewer pipe [9-05.12(1)]
- Profile wall PVC sanitary sewer pipe [9-05.12(2)]
- Manholes per City of Redmond Standard Specifications and Details drawing number 840 (except that catch may be provided in lieu of channeling and flat tops may be used in lieu of offset cone sections).
- Catch Basins:
 - Per City of Redmond Standard Specifications and Details except that: pipe connections shall utilize sand collars as shown for sanitary sewer manholes; only pre-cast catch basins may be used; and the inside of all catch basins shall be grouted to a minimum thickness of $\frac{3}{4}$ ".

Construction

Construction shall be as required by City of Redmond for sanitary sewer systems. See 2000 WSDOT/APWA Standard Specifications and City of Redmond Standard Specifications and Details.

Testing

Testing may be required by the City Inspector. If required, testing shall be in accordance with the 2000 WSDOT/APWA Standard Specifications 7-17.3(2)F.

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CHAPTER 3

PROJECT CLASSIFICATION IN REDMOND

For purposes of stormwater management in Redmond, projects are classified as Small, Medium, or Large. The classifications are based on the criteria in the 2001 Ecology Manual:

Small Projects:

- Less than 2000 square feet of new and/or replaced impervious surface and
- Less than 7000 square feet of land disturbance.

Medium Projects:

Areas exceed either of the criteria above for Small Projects and involve:

- Less than 5000 square feet of new impervious area and
- Less than $\frac{3}{4}$ acre of native vegetation converted to lawn or landscaped areas and
- Less than 2.5 acres of native vegetation converted to pasture.

Large Projects

Areas exceed one or more of the criteria above for Medium Projects.

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CHAPTER 4

SMALL PROJECT REQUIREMENTS

Small Projects are those that involve:

- Less than 2000 square feet of new and/or replaced impervious surface and
- Less than 7000 square feet of land disturbance.

Small Projects are required to meet Minimum Requirement #2 of the 2001 Ecology Manual. This minimum requirement lists provisions for stormwater management during construction. The list is summarized in Table 4-1, following.

Note that the measures in Table 4-1 need to be followed but a formal plan does not usually need to be prepared or approved by the City. A formal plan and City approval (as well as a Clearing & Grading Permit or an equivalent permit) are required when the proposed work is in one of the following types of Sensitive Areas:

Wetlands

Wetland Buffers (which range in width from 0 to 150 feet depending on the wetland type)

Streams

Stream Buffers (which range in width from 0 to 150 feet depending on the stream classification)

Critical Wildlife Habitat Areas (with presence of proposed or listed species as endangered, threatened, sensitive, monitor or priority)

Steep Slopes (over 40%)

Floodways designated on FEMA Maps

Contact the Permit Center at (425)556-2473 or the Development Services Division at (425)556-2760 for further information about Sensitive Areas.

TABLE 4-1
SMALL PROJECT
CONSTRUCTION STORMWATER POLLUTION REQUIREMENTS

Add the following notes to plan sets and follow the notes during construction:

1. Mark Clearing Limits.
2. Establish Construction Access (offsite streets must be kept clean).
3. Control Flow Rates (don't impact downslope properties).
4. Install Sediment Controls (filter fabric fences are commonly used sediment controls; runoff from a construction site should not have "cloudiness" –or turbidity- that exceeds 50 NTUs).
5. Stabilize Soils (plastic coverings and mulches or common practices).
6. Protect Slopes (keep runoff off of steeper slopes – use diversion ditches and temporary surface drain pipes).
7. Protect Drain Inlets (covering inlets with filter fabric is a common practice; gravel or other "pre-filtering" measures may be needed to keep the filter fabric from plugging).
8. Stabilize Channels and Outlets (line temporary on-site conveyance channels to prevent erosion – or use temporary surface conduits).
9. Control Pollutants
 - All pollutants, including waste materials and demolition debris, that occur on site during construction shall be handled and disposed of in a manner that does not cause contamination of stormwater.
 - Cover, containment, and protection from vandalism shall be provided for all chemicals, liquid products, petroleum products, and non-inert wastes present on the site (see Chapter 173-304 WAC for the definition of inert waste).
 - Maintenance and repair of heavy equipment and vehicles involving oil changes, hydraulic system drain down, solvent and de-greasing cleaning operations, fuel tank drain down and removal, and other activities which may result in discharge or spillage of pollutants to the ground or into stormwater runoff must be conducted using spill prevention measures, such as drip pans. Contaminated surfaces shall be cleaned immediately following any discharge or spill incident. Emergency repairs may be performed onsite using temporary plastic placed beneath and, if raining, over the vehicle.
 - Wheel wash, or tire bath wastewater, shall be discharged to a separate on-site

treatment system (or to the sanitary sewer if specific permission is granted by the City).

- Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations shall be followed for application rates and procedures.
- Management of pH-modifying sources shall prevent contamination of runoff and stormwater collected on the site. These sources include, but are not limited to, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters.

10. Control De-Watering

- All foundation, vault, and trench de-watering water, which has similar characteristics to stormwater runoff at the site, shall be discharged into a controlled conveyance system, prior to discharge to a sediment trap or sediment pond. Channels must be stabilized, as specified in Element #8.
- Clean, non-turbid de-watering water, such as well-point ground water, can be discharged to systems tributary to state surface waters, provided the de-watering flow does not cause erosion or flooding of the receiving waters. These clean waters should not be routed through sediment ponds with stormwater.
- Highly turbid or otherwise contaminated dewatering water, such as from construction equipment operation, clamshell digging, or work inside a cofferdam, shall be handled separately from stormwater at the site.
- Other disposal options, depending on site constraints, may include: 1) infiltration, 2) transport offsite in vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters, 3) onsite treatment using chemical treatment or other suitable treatment technologies, or 4) sanitary sewer discharge with local sewer district approval if there is no other option.

11. Maintain BMPs

- All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. All maintenance and repair shall be conducted in accordance with BMPs.
- Sediment control BMPs shall be inspected weekly or after a runoff-producing storm event during the dry season and daily during the wet season.
- All temporary erosion and sediment control BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil areas resulting from removal of BMPs or vegetation shall be permanently stabilized.

12. Manage the Project

- Work may be ordered stopped, and the site secured, from October 1 through April 30 if stormwater control is not satisfactory.
- All stormwater control facilities shall be maintained and repaired to assure continued performance during construction.
- Sampling and analysis of stormwater discharges may be ordered by the City.

13. Also add the applicable notes from Table 4-2 to the construction plans.

Considerable and detailed additional information about runoff control during construction is contained in Volume II of the 2001 Ecology Manual.

TABLE 4-2
STANDARD CONSTRUCTION PHASE NOTES

1. Keep off-site streets clean at all times. Use sweepers, flushing streets shall not be allowed.
2. Additional erosion/sediment control measures may be required by City Inspector if standards are not being achieved.
3. When work is stopped/completed in an area, provide post-construction erosion control including seeding or other measures.
4. Locations shown of existing utilities are approximate. It shall be the responsibility of the contractor to verify the correct locations to avoid damage or disturbance.
5. It shall be the responsibility of the contractor to obtain street use and other related permits prior to any construction.
6. All ground cover is to remain undisturbed outside of clearing areas.
7. The temporary erosion/sediment controls shall be installed, inspected, and operating before any grading or extensive land clearing. These controls must be satisfactorily maintained until construction and landscaping are complete.
8. Tie impervious surfaces (roof, streets, driveways, etc.) to completed drainage system as soon as possible.

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